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ABSTRACT

This report describes the instruction, assessment, and staff development of the Multicultural Reading and Thinking (McRAT) program and summarizes the results of a one-year study conducted in 1989-90. (McRAT is a nationally recognized staff development program designed to help teachers infuse higher order thinking skills and multicultural concepts into the existing curriculum.) The report (1) outlines the 4 kinds of reasoning--analysis, comparison, inference/interpretation, and evaluation--that students can use in academic subjects; (2) discusses various types of writing assessment; (3) describes the staff development program offered by McRAT; and (4) offers the (positive) results of a study designed to gain information on the effectiveness of the McRat instructional approach. Ten figures and three tables of data are included.(PRA)

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McRAT Report

MultiCultural Reading and Thinking

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McRAT Report

MultiCultural Reading and Thinking

Number 1 ARKANSAS DEPARTMENT OF EDUCATION January 1991

McRAT Approach Benefits All Students

Multicultural Reading and Thinking (McRAT) is a nationally recognized staff development program designed to help teachers infuse higher order thinking skills and multicultural concepts into the existing curriculum. McRAT focuses on four kinds of reasoning skills that students can use in academic subjects and that also transfer to practical situations. These four kinds of reasoning-analysis, comparison, inference/interpretation, and evaluation - are fundamental to frameworks of inquiry, problem solving, and critical thinking proposed by philosophers, psychologists, and curriculum designers (Quellmalz 1985, 1987). A definition of higher order thinking that guides instruction and assessment of the McRAT program is shown in Figure 1. McRAT is appropriate for all students regardless of achievement level or socioeconomic factors and does not require the purchase of additional instructional materials or classroom resources.

McRAT has been developed in Arkansas through a collaborative effort of teachers and Department of Education reading specialists. The project has received funding from the Arkansas Department of Education, the Winthrop Rockefeller Foundation, and Chapter II. It is presently being implemented in over 100 classrooms (Grades 3-8) in 23 school districts in Arkansas. McRAT students represent a wide range of achievement and socioeconomic levels.

This report describes the instruction, assessment, and staff development of the McRAT program and summarizes the results of a one-year study conducted in 1989-90.

INSTRUCTION

Instruction focuses on four kinds of reasoning - analysis, comparison, inference/interpretation, and evaluation - that students can use in all academic

Figure 1

Definition of Higher-Order Thinking

Students engage in purposeful, extended lines of thought during which they:

- Identify the task or problem type.
- Define and clarify essential elements and terms.
- Judge and connect relevant information.
- Evaluate the adequacy of information and procedures for drawing conclusions and/or solving problems.

In addition, students become self-conscious about their thinking and develop self-monitoring problem-solving strategies.

Commonly specified higher-order reasoning processes are:

1. Cognitive	2. Metacognitive
Analyze	Plan
Compare	Monitor
Infer/Interpret	Review/Revise
Evaluate	

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subjects and that also transfer to practical situations.

Students learn explicit strategies for each kind of reasoning and develop an awareness of how the strategies can transfer across problems. This awareness helps them to plan, monitor, and evaluate their critical thinking processes. During instruction in analysis, for example, students learn a set of explicit general strategies for analyzing anything. Strategies for the skill of analysis are displayed on posters in the classroom and printed on cards kept by the students (Fig. 2). Students apply these general strategies to different lesson concepts and practical situations.

Figure 2

Student Thinking Strategies: Analysis

Students identify essential components and explain how they relate to the whole. As students go through the process of analyzing, they should ask themselves the following questions:

1. Am I naming what is to be analyzed?
2. Am I gathering enough information about it?
3. Am I sorting the information into groups or parts?
4. Am I explaining how the parts relate to the whole? So what? Why are these parts important or essential?

For example, they might analyze the process of evaporation in science, the social institutions of a culture in social studies, the different types of literature in English or reading, or the chores and responsibilities of family members at home. McRAT lessons directly address State objectives for reading comprehension, literature, and social studies. Specific skills are taught within the context of reading/thinking activities, not in isolation.

Teachers develop generic lesson objectives that can be applied to other lessons with similar concepts. For example, for lessons focusing on strategies for Analysis, generic literature/reading objectives might be, "Analyze the thoughts, feelings, and actions of the main character" or "Analyze the elements of the plot." Similarly, generic questions for applying analysis strategies to multicultural concepts might be, "What are the social, environmental, political, economic, or artistic elements of this culture?" or "How do the actions of the character reflect the customs, values, and beliefs of the culture?" Such generic objectives and questions may be applied to similar concepts or stories. For example, after reading the story, "Make Room for Uncle Joe," fifth grade students at Batesville Intermediate School analyzed the thoughts, feelings, and actions of the characters as they adjusted to the needs of a handicapped relative. Fourth grade students at Jones Elementary School in Hot Springs applied the same objective to a character analysis of Chibi, the main character in the story, "Crow Boy," to understand the problem of being "different" from other students in his class.

Lessons or units of study related to interdisciplinary concepts such as cultural diversity, cultural assimilation, or communication often involve activities with parents and community. For example, fourth grade students at Monticello Intermediate School read the story, "The Patchwork Quilt," which is about a girl who helps her grandmother make a beautiful quilt to tell the story of her family's life. Then the students visited the local Senior Citizens Center, where residents shared their family memories and demonstrated quiltmaking. With help from the senior citizens, students designed and constructed a memory quilt for their school.

Persons of various cultural backgrounds often visit classrooms to share their traditions, values, and beliefs. They also assist with activities that give students and parents an opportunity to experience the customs of cultures different from their own. For example, more than 100 parents and students participated in the Spanish Fiesta sponsored by sixth graders at Monticello Intermediate School last year, and parents of fifth graders at Whiteside Elementary School in Camden joined the students for a Chinese luncheon.

During each lesson, students

receive direct instruction on use of thinking strategies through teacher modeling, explanation, guidance, and feedback. Each lesson guides students through an inquiry process involving nine components (Quellmalz and Hoskyn 1988; Fig. 3).

McRAT instruction emphasizes discussion and writing as vehicles for fostering critical thinking. In the report of the Carnegie Foundation for the Advancement of Teaching, Ernest Boyer (1983) states: "Clear writing leads to clear thinking; clear thinking is the basis of clear writing. Writing is an essential skill for self-expression and the means by which critical thinking also will be taught." McRAT writing assignments take students beyond simple recall and summarization tasks; the assignments require them to interpret and evaluate what they have read and to explain and defend their reasoning.

Teachers use a variety of tools to facilitate discussion and thinking. Visual mapping helps students to organize and relate information. Interactive strategies such as cooperative learning, small group discussion, and story retelling help students to look at opposite sides of an issue, bring evidence to what they believe or do not believe and become empathetic listeners.

Figure 3

Elements of McRAT Lessons

1. **Motivation:** explaining why the general thinking strategy is important in school and practical situations.
2. **Goal setting:** telling students the focusing question of the lesson.
3. **Introduction/planning:** explaining and modeling briefly use of the thinking strategies for a simple concept or topic similar to the one in the lesson, reviewing background experience relevant to the concept or topic, and reviewing appropriate reading or information-gathering strategies.
4. **Read/gather information:** guiding students through a process of purposeful reading or reviewing.
5. **Analyze/interpret**: use of modeling, discussion, guided practice, and visual mapping to take information gathered, sort it, and interpret it to perform the lesson's desired analysis, comparison, inference, or evaluation.
6. **Write/synthesize:** writing or presenting the entire analysis, comparison, interpretation, or evaluation .
7. **Assess:** use criteria for effective use of the thinking strategies to evaluate essays or discussions.
8. **Revise/review:** use strong and weak examples from student responses to give feedback and practice on strengthening weak reasoning or evidence; review and summarize thinking strategies used.
9. **Transfer:** discuss how thinking strategies apply to other similar situations, other school subjects, and practical situations.

ASSESSMENT

While assessment of student progress and achievement involves a variety of performance-based measures, McRAT assessment focuses on the evaluation of student writing. In a national report on reading achievement based on the 1986 National Assessment of Educational Progress, Applebee (1988) states:

Writing has the potential to foster deeper and more critical thinking about what a student has read. When students are asked to analyze, interpret or evaluate what they have read (and to do so in writing), they must not only reason effectively but must also communicate their ideas in ways that others can understand. This sort of critical thinking is often perceived to be at the heart of an academic education.

Whether students write essays or present their synthesis of activities orally, teachers and students

use criteria derived from the thinking strategies to determine how well the presentations applied the thinking strategies. Students can use a simplified version of the criteria as a checklist to evaluate their work (Quellmalz and Hoskyn 1988; Fig. 4). The teachers' versions have numerical ratings. Procedures for evaluation of student writing and other components of assessment are described below.

Evaluation of Student Writing

Prompts for pre- and post-writing assessment have been developed to monitor McRAT students' thinking skills development. In these essays, students draw upon their background experience to apply one of the thinking skill categories. For example, students might analyze the characteristics of a friend or evaluate a school problem. Teachers and reading specialists evaluate these essays by rating on a scale of 1 (low) to 4 (high) to reflect the degree to which the essay demonstrates the use of strategies for analysis, comparison, inference/interpretation, or evaluation. A score of "1" generally indicates that a feature is absent or inaccurate, while a score of "4" indicates that the feature is fully developed. A rating guide has been developed that describes the evaluative criteria and explains how the criteria apply to sample student essays (Quellmalz 1988).

These procedures apply to both classroom assessment by teachers and program evaluation. In addition to evaluating students' skill development, the results are useful to teachers in evaluating and designing instruction. To provide data on program effectiveness, a representative sample of essays is scored annually by teams of experienced teachers and reading specialists.

Figure 4

Evaluative Criteria for Student Responses

(Student Version)

When students have finished their analysis, they may use the following questions to evaluate their analyses:

1. Did I name and define what I analyzed? Did I name important parts or groups of information about it?
2. Did I describe enough information and examples for each group or part?
3. Did I explain how the parts relate to the whole and why they are important? So what?

Metacognitive Tasks

Students are interviewed individually and asked to apply one of the four reasoning processes. For example, an elementary student may be asked to analyze the kinds of clothes that boys and girls wear for school and special occasions. As the student goes through the process, he/she explains, orally or in writing, the strategies being used and how they might apply to other situations.

Questions

Assignments are given that require students to identify the thinking process, to categorize questions, or to generate questions of their own for each of the thinking skill categories (Stiggins, Rubel, and Quellmalz 1986).

Portfolios

McRAT teachers use portfolios as systematic and organized collections of evidence to monitor and show student growth in skill development, to communicate student learning to parents and others, and to evaluate success in reaching instructional goals. They may also serve as tools for involving students in making decisions about their work and monitoring their own progress. Folders for each student include pre- and post-writing assignments, essays from McRAT lessons and other critical thinking activities, sample writings from other curricular areas, examples of student use of organizational strategies such as mapping, and other appropriate information.

STAFF DEVELOPMENT

The staff development program is a collaborative effort of the Department of Education Reading Program, participating school districts, and three higher education institutions.

McRAT teachers participate in an intensive two-year staff development program that includes twelve days of training provided through summer institutes and a series of one-day workshops scheduled during the school year. Principals attend the summer institutes. Schedules are determined in collaboration with school administrators (Hoskyn 1990).

Department of Education reading specialists also meet with teachers at each school monthly to collaborate on plans for implementation, develop critical thinking lessons, share ideas and evaluate samples of student writing. Teachers are released from classroom duties for one-half day each month to attend these meetings.

A trainer-of-trainers program is being developed that will prepare McRAT teachers to provide leadership for dissemination of the program within their school districts.

Continuing Education courses offered at the University of Arkansas at Little Rock and Arkansas Tech University provide graduate credit for McRAT training. Arkansas College at Batesville supports research and evaluation.

RESULTS OF ONE-YEAR STUDY 1989-90

Department of Education reading specialists and Arkansas College professors Clara Jennings and Taylor Thompson conducted a study to gain information on the effectiveness of the McRAT instructional approach. The 1989-90 study compared the writing of McRAT students, who received direct instruction on thinking strategies, with students who received typical classroom instruction during one school year.

Students

A total of 340 fourth-, fifth-, and sixth-grade students were randomly selected in six geographically distributed schools participating in the McRAT program. The McRAT sample included 108 fourth-grade, 79 fifth-grade, and 47 sixth-grade students (Table 1). The sample was composed of 60 percent regular class, 23 percent Chapter I, and 17 percent Gifted & Talented students. The control sample included 58 fourth-grade, 28 fifth-grade, and 20 sixth-grade students. It was composed of 74 percent regular class, 10 percent Chapter I, and 15 percent Gifted & Talented students. A wide range of socio-economic and achievement levels was represented in the study.

Teachers

A total of 28 teachers, including 16 McRAT and 12 non-McRAT teachers, were involved in the study. Of the 16 McRAT teachers, five had received training during the previous year and had one year of McRAT teaching experience; 11 had received one week of training during the summer and were beginning

Table 1

Sampling of Students in Six McRAT Schools Grades 4, 5 and 6

Schools	A		B		C		D		E		F		Total	
No. of Students	McRAT	Control	McRAT	Control	McRAT	Control	McRAT	Control	McRAT	Control	McRAT	Control	McRAT	Control
Grade 4	16	10	43	11	10	8	18	11	8	11	13	7	108	58
Grade 5	42	7	19	7	10			7	8	7			79	28
Grade 6			19	13	17						11	7	47	20

their first year of teaching in the program. The 12 non-McRAT teachers who volunteered to participate in the control study had not received McRAT training but taught in the same schools as the McRAT teachers.

Procedures

All students received approximately 8 months of classroom instruction. The academic subjects were the same for both McRAT and control groups at each grade level. None of the students had received McRAT instruction before September 1989.

The McRAT group received systematic instruction on strategies for the four thinking categories and applied them within a standard curriculum at each grade level. Following established procedures for first-year instruction, the focus of instruction and writing assignments began with Analysis in September, and other skills were added at approximately two-month intervals in the following order: Comparison in November; Inference/Interpretation in January; and Evaluation in March. Analysis and Comparison skills were developed first because they are often components of inferential and evaluative processes. Each student wrote a minimum of four essays per thinking skill category. The control group received no comparable instruction on thinking strategies, although, being in the same school, they were aware of the McRAT Program and activities.

Pre- and post-writing assessments for each of the four categories were administered to all students. Pre-assessments covering all four skills were administered to both McRAT and control groups in September. Following established procedures for first-year instruction, post-assessments for each of the skills were administered to McRAT students after two months of instruction on that skill and before the next skill was introduced. These staggered evaluations helped teachers to monitor student progress and to make instructional decisions. The post-assessment for Evaluation only was administered to McRAT students in May. Post-assessments covering all four skills were administered to control students in May. With the exception of the Evaluation category, McRAT scores were based on two, four, or six months of instruction compared with eight months of instruction for control students.

Pre- and post-assessments were administered by classroom teachers of both groups. Each student received a copy of the prompt with written instructions and was asked to read the prompt and respond. No explanation was given about how to complete the task. In each task, students were asked to draw upon background knowledge and use strategies to complete the task. The assignments were not timed, and students gave their essays to the teacher when completed. Pre- and post-assessments for each skill were similar (Fig. 5).

Scoring

Writing prompts were scored by teams of trained, experienced scorers. Each prompt was coded for identification and rated by two different scorers. All scorers received additional training and practice before official scoring began for each thinking category.

Criteria and scoring procedures used were those outlined in the *McRAT Rating Guide for Teacher Evaluation of Student Writing* (Quellmalz 1989). Each pre- or post-assessment was scored on the basis of five criteria, except Evaluation, which was based on six. Evaluators rated each criterion with scores from l (low) to 4 (high). Responses which were off-task (not in essay form, e.g., a list of words or sentences or not addressing the topic or issue of the writing assignment) received a score of 0. Scores between whole numbers were denoted with + or -; for example, a score might be 2, 2+, 3-, 3, or 3+. When translating these scores to averageable numbers, a scale of O to 20 was used as follows: 0=0; 1=2; 2- =6; 1+=4; 2=8; 2+ =10; 3-=12; 3=14; 3+=16; 4-=18; and 4=20. Scores from two trained scorers were averaged for each prompt. For example, if one scorer gave a student a score of "2" on Analysis criterion, "Identifying and

defining what is being analyzed," and another scorer gave the student a score of "2+", the averaged score was (8+10)/2, or 9. The highest possible score for Analysis, Comparison, or Inference/Interpretation on the pre- and post-assessments was 5 x 20, or 100; for Evaluation, with six criteria, it was 120.

Results

In each of the four reasoning categories, mean ratings of fourth and fifth-grade McRAT students were lower than control students on the pre-assessment, but significantly higher on the post-assessment. The McRAT group showed significantly greater gains although the percentage of Chapter I remedial reading students in the McRAT group was more than twice that of the control group. Twenty-five percent of the McRAT sample and 10 percent of the control sample at grades four and five were enrolled in Chapter I remedial classes. Many of the Chapter I students wrote off-task on the pre-assessment.

The sixth grade students followed the same pattern but the results were statistically significant for the category of Comparison only. This was due to the fact that the number of sixth-graders in each group, control and McRAT, was smaller than in grades four and five, requiring a larger difference in the mean to produce significance. Other possible factors are discussed with results for each of the four skill categories.

Figure 5

Pre- and Post-Assessment Thinking Skill: Analysis

PRE-PROMPT
ANALYZE

ASSESSMENT 1: ANALYZE

In your school there are probably places or areas used for separate activities. For example, some places are especially for reading or playing.. ANALYZE your school by thinking of at least three separate places set aside for particular activities. What kinds of places or areas are they? Why do they look like? What do people do in them? Why are they important parts of the school?

WRITING ASSIGNMENT:

Write an essay in which you ANALYZE the places in your school. Ask yourself:
1. Did I name what I am ANALYZING?
2. Did I identify three separate parts/places?
3. Did I describe each place and what people do there?
   Did I explain how each place is special?
4. Did I explain why there are important places in the school?

POST-PROMPT
ANALYZE

ASSESSMENT 2: ANALYZE

In your home there are rooms and areas used for separate activities. For example, some rooms are especially for eating or bathing, meeting or playing. ANALYZE your home by thinking of at least three separate places set aside for particular activities. What kinds of places or areas are they? What do they look like? What do people do in them? Why are they important parts of the home?

WRITING ASSIGNMENT:

Write an essay in which you ANALYZE the places in your home. Ask yourself:
1. Did I name what I am ANALYZING?
2. Did I identify three separate parts/places?
3. Did I describe each place and what people do there?
   Did I explain how each place is special?
4. Did I explain why there are important places in the home?

ANALYSIS

Pre- and post-writing assessments for Analysis were designed to measure how well students could identify essential components and explain how they relate to the whole. Students were asked to analyze the places in their school or home (Fig. 5).

Mean ratings of fourth- and fifth-grade McRAT students were lower than the control students on the pre-assessment, but after two months of instruction, showed significantly higher gains than control students after eight months of

standard classroom instruction. Mean scores of fourth-grade students increased from 18 to 58 while control students showed no gains. Mean scores of fifth-grade McRAT students increased from 29 to 61, the highest score for any group, while control students increased from 46 to 48. Sixth grade students followed the same pattern. Although not statistically significant, mean scores of McRAT students increased from 30 to 59 while control students increased from 56 to 60 (Fig. 6).

Figure 6

Thinking Skill: Analysis
Pre- and Post-Evaluation of Student Writing
Grades 4, 5 and 6

Maximum Possible Score = 100

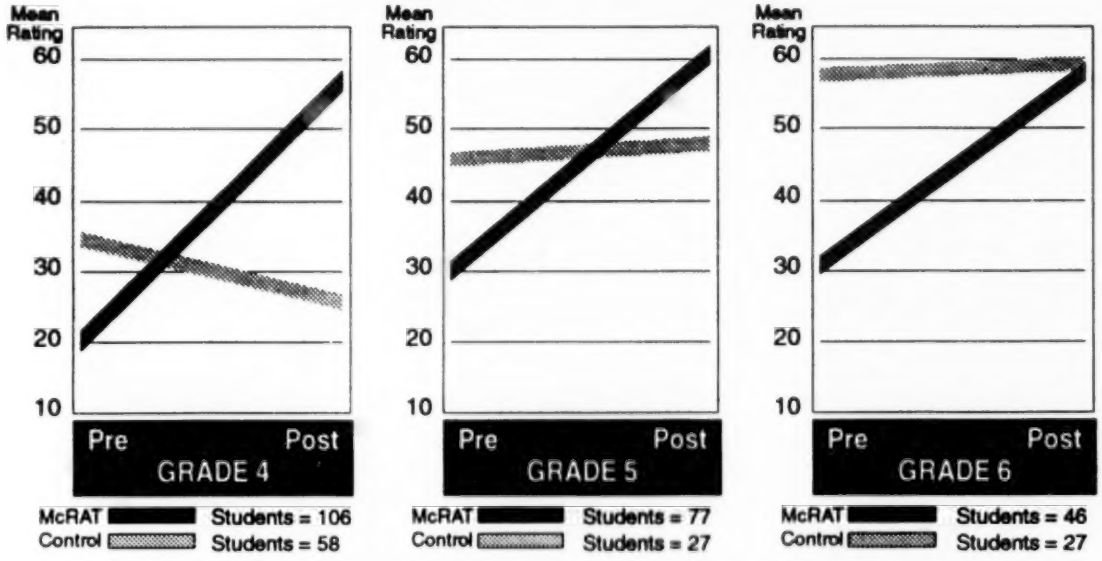
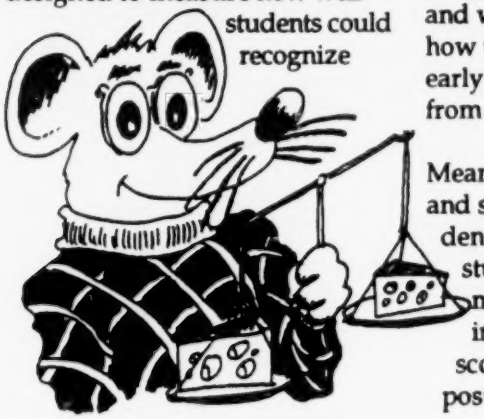


Figure 6 shows a comparison of mean group ratings of McRAT students after 2 months of instruction vs. control students after 8 months.

COMPARISON

Pre- and post-writing assessments for Comparison were designed to measure how well students could recognize and explain similarities and differences. Students were asked to read a selection about early Native American food or homes and write an essay explaining how the food or homes of the early Native Americans differ from modern food or homes.



Mean ratings of fourth-, fifth-, and sixth-grade McRAT students were lower than control students on the pre-assessment. After four months of instruction, McRAT students scored significantly higher on post-assessment than control students after eight months of instruction (Fig. 7). Group mean ratings of fourth-grade McRAT students increased from 14 to 52 while ratings of control students increased from 20 to 24. Mean ratings for fifth-grade McRAT students increased from 17 to 51 while ratings for control students increased from 24 to 30. Mean ratings for sixth-grade McRAT students increased from 23 to 51 while mean ratings for control students increased from 31 to 42.

Figure 7

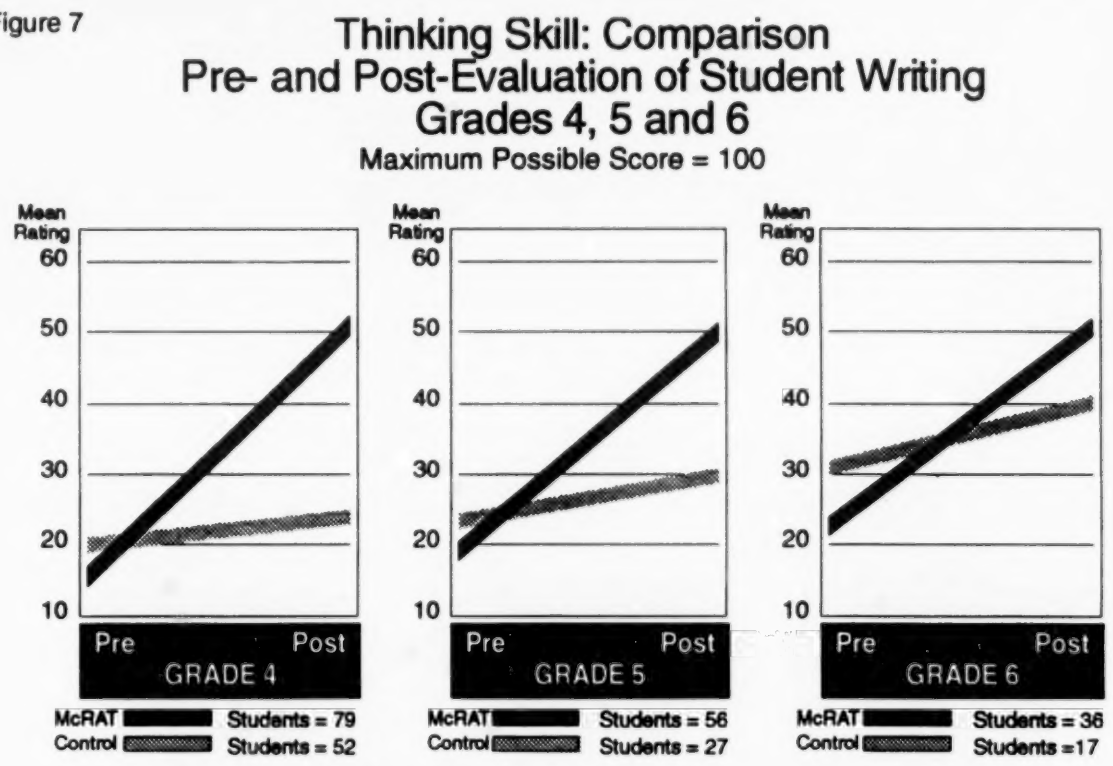


Figure 7 shows a comparison of mean group ratings of McRAT students after 4 months of instruction vs. control students after 8 months.

INFERENCE/ INTERPRETATION

Pre- and post-writing assessments for the category of Inference/Interpretation were designed to measure how well students could relate and use evidence, clues, and information to support or infer a conclusion or generalization. Students were asked to read a selection and infer the kind of mood or feeling created by the author, e.g., scary or happy.

McRAT students scored lower on the pre-assessment than control students, but after six months of instruction, showed significantly higher gains on the post-assessment than control students after eight months of standard classroom instruction (Fig.8). For example, mean scores of fourth-grade McRAT students increased from 18 to 58, while control students showed no increase. Scores for fifth-grade McRAT students increased from 29 to 61 while scores for control students increased from 46 to 48. Scores for sixth-grade McRAT students increased from 30 to 59, while scores for control students increased from 56 to 60.

Overall, mean ratings for Inference/Interpretation were lower than those for the other reasoning categories, reflecting the higher number of off-task responses for both McRAT and control groups. Two possible factors may be the increased complexity of the task and that instructional emphasis on Inference was scheduled during the months of January and February when many teachers

Figure 8

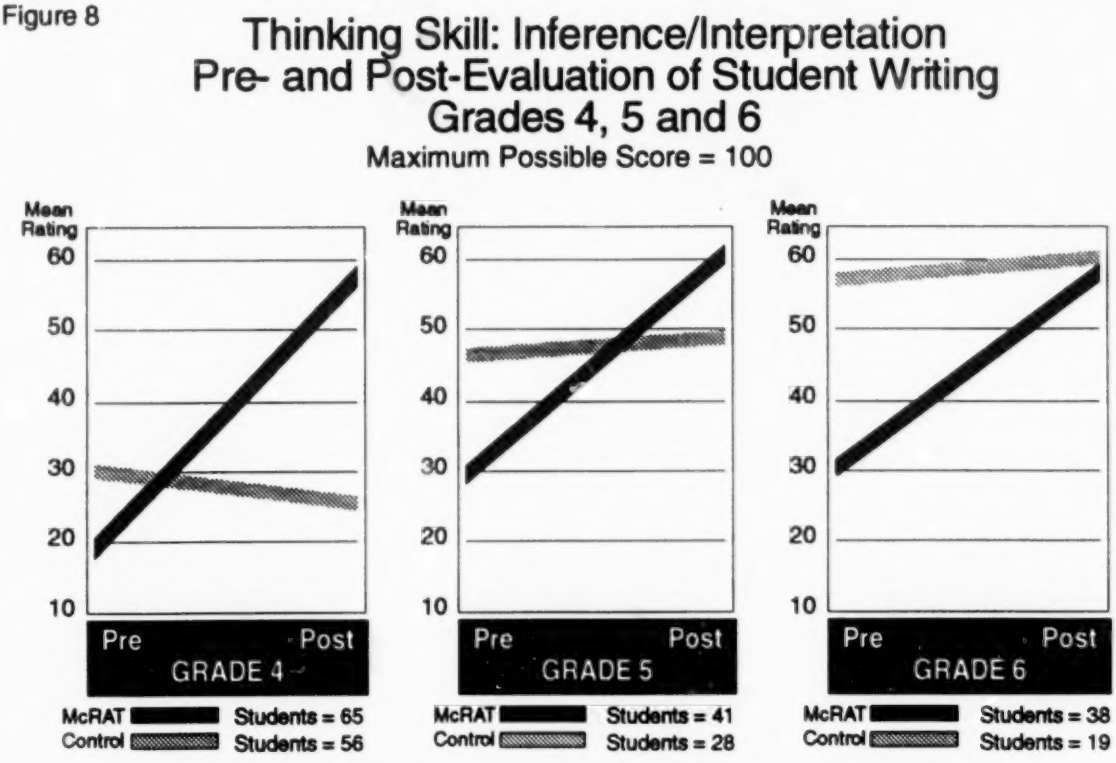


Figure 8 shows a comparison of mean group ratings of McRAT students after 6 months of instruction vs. control students after 8 months.

spend a significant amount of time preparing for statewide testing in March. Therefore, students may have received less instruction in this skill category.

EVALUATION

Writing assessments for Evaluation were designed to measure how well students could evaluate by analyzing issues or problems, gathering evidence and applying criteria to reach a decision or judgment about what to believe or do. Students were asked to write an essay in which they agreed or disagreed with a hypothetical decision made by the school principal or mayor and to explain why. For example, in the pre-assessment, students responded to the mayor's statement that all TV sets should be unplugged, and in the post-assessment, to the principal's statement that all games should be forbidden at school.

Post-writing assessments were administered to both McRAT and control groups in May after each had received eight months of instruction. McRAT students received instruction in thinking strategies while control students received standard elementary classroom instruction. Again, mean ratings of McRAT student responses were lower on the pre-assessment and higher on the post-assessment than the control students at each grade level (Fig. 9). For example, mean ratings of the McRAT group responses increased from 22 to 57 for fourth-grade; from 24 to 47 for fifth-grade; and from 35 to 52 for sixth-grade. Mean ratings of control group responses showed no increase at any of the three grade levels.

Figure 9

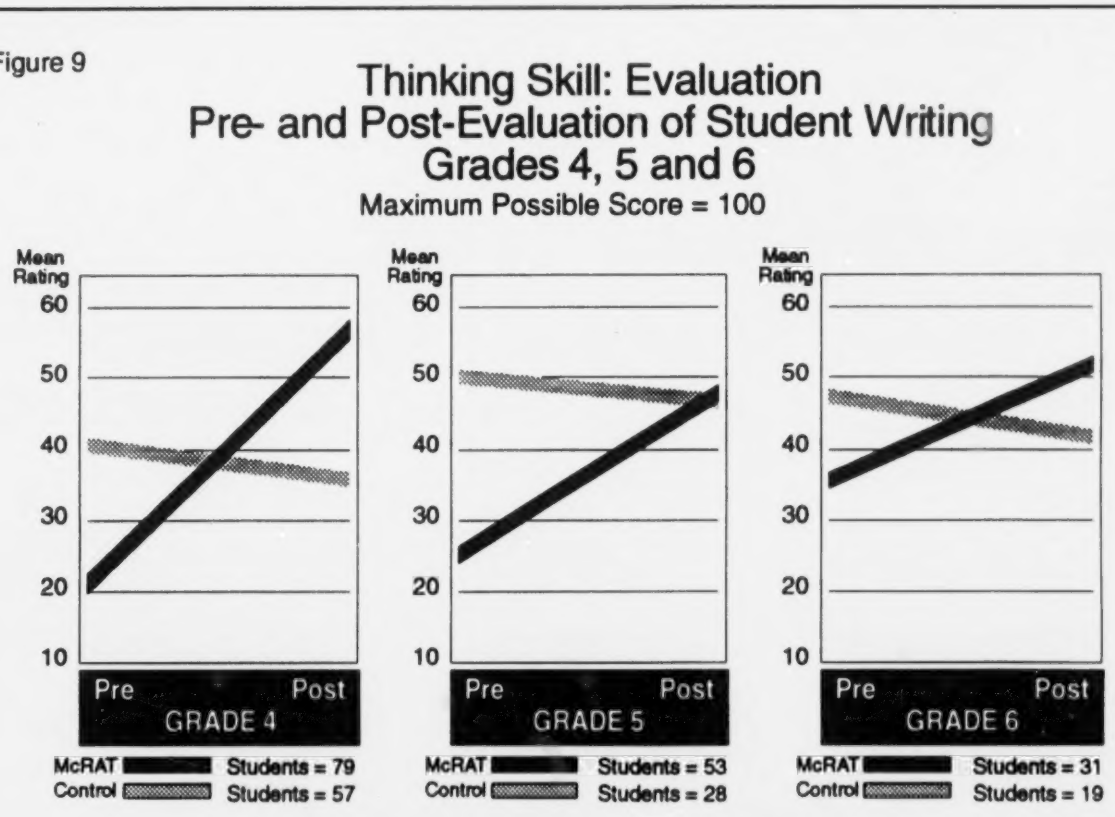


Figure 9 shows a comparison of mean group ratings of McRAT and control groups after 8 months of classroom instruction.

ANALYSIS OF OFF-TASK RESPONSES

In each of the four reasoning categories, pre- and post-evaluation of student writing showed a significant decrease in the number of off-task responses of McRAT students, but no significant decrease for control students. Results for grades four, five and six show the same general trend (Table 2).

The total number of off-task responses in the McRAT group decreased from 73 to 1 in the Analysis category and from 52 to 1 in the Comparison category. The off-task response in the post-assessment for both categories was made by the same fifth-grade student. The number of off-task responses in the control group increased from 6 to 27 in the Analysis and 13 to 18 in the Comparison categories. Off-task responses in the Inference/ Interpretation and Evaluation categories followed the same pattern. The number of McRAT student off-task responses decreased from 68 to 10 in the Inference category and from 49 to 7 in the Evaluation category. The number of off-task responses in the control group showed no significant change, decreasing from 38 to 37, in the Inference category and increasing from 5 to 10 in the Evaluation category.

Table 2

Comparison of Number Of Off-Task Responses

Pre- and Post-Evaluation of Student Writing

Grades 4, 5, and 6

	McRAT Group		Control Group	
	Pre	Post	Pre	Post
Analysis				
Grade 4	41	0	5	25
Grade 5	21	1	1	1
Grade 6	11	0	0	1
Comparison				
Grade 4	27	0	10	14
Grade 5	20	1	3	4
Grade 6	5	0	0	0
Inference/Interpretation				
Grade 4	29	0	22	26
Grade 5	23	6	9	9
Grade 6	16	4	7	2
Evaluation				
Grade 4	26	2	5	9
Grade 5	19	3	0	1
Grade 6	4	2	0	0

The highest number of off-task responses in each of the thinking categories occurred at the fourth-grade level possibly reflecting the relative lack of writing experience of fourth-graders as compared with fifth- and sixth-graders. The higher number of off-task responses on pre-assessments in the fourth-grade McRAT group correlated with the number of Chapter I students in the group. The proportion of Chapter I students who wrote off-task on the pre-assessment was higher than other students. On the post-assessment, there were no off-task responses in the fourth-grade McRAT group for Analysis, Comparison, and Inference/ Interpretation, and only two in the Evaluation category. The increased number of off-task responses observed in the fourth-grade control group post-assessments occurred in one classroom, possibly indicating an environmental factor.

CHAPTER 1 AND MINORITY STUDENTS

Pre- and post-assessment results of fourth-grade Chapter I students followed the same general trend as those of other groups in the study. The McRAT Chapter I students scored lower on the pre-assessment than control students, but scored higher than control students on the post assessments. Fifth- and sixth-grade Chapter I students were not used in a comparison because of the small number of Chapter I students in the control groups.

Mean ratings of fourth-grade McRAT Chapter I students were lower than the whole fourth-grade McRAT group on both pre-and post-assessment, but the margin of difference was smaller on the post-assessment. The score gain for Chapter I students in each skill area was: Analyze +44; Comparison +40; Inference +40; and Evaluate +34. These gains were slightly greater than the score gains between pre- and post-assessment for the fourth-grade McRAT group as a whole.

In the control group, mean ratings of fourth-grade Chapter I students were approximately the same as those of other students in the control group on the pre-assessment, but were significantly different on the post-assessment. On the post-assessment, Chapter 1 students scored higher than other control group students on Comparison and Inference/Interpretation, but lower on Analysis and Evaluation. This comparison within the control group is not statistically significant because of the small number of Chapter 1 students in the group. All control group students, including Chapter 1, scored significantly lower than McRAT Chapter 1 students (Fig. 10).

Figure 10

Comparison of Mean Ratings
Students in Chapter I, McRAT and Control Groups
Grade 4

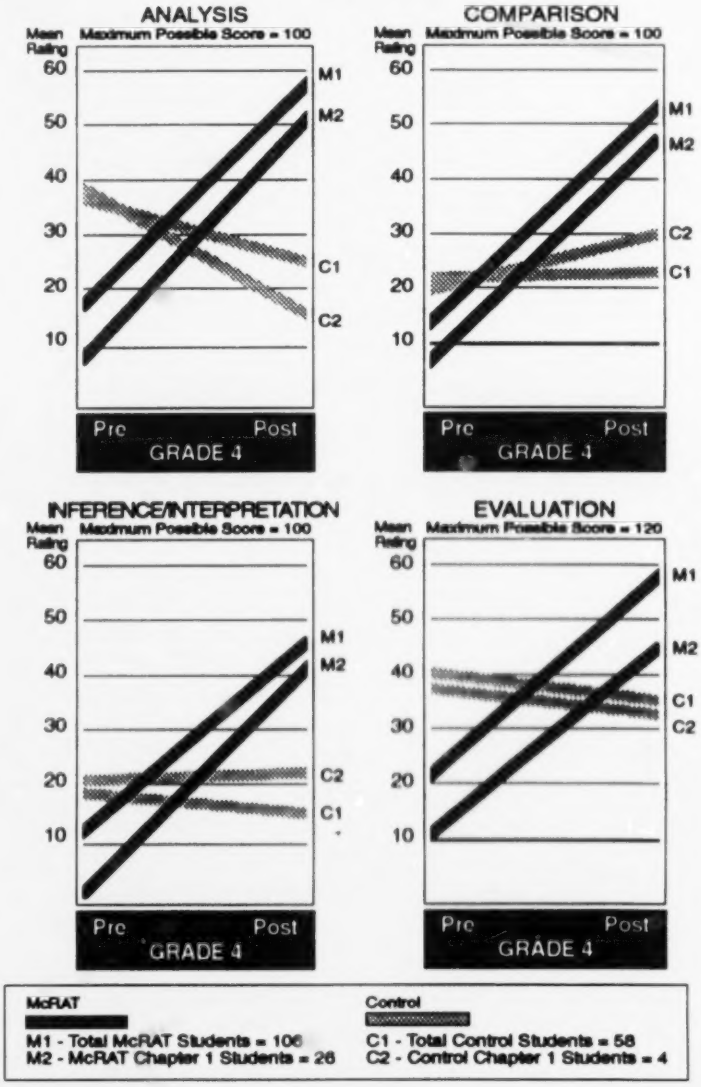


Table 3

Comparison of Mean Ratings of Minority and Non-Minority Students in the McRAT Group

Grades 4, 5, and 6

	Minority			Non-Minority			Number of Students	
	Pre	Post	Gain	Pre	Post	Gain	Minority	Non-Minority
Grade 4:								
Analysis	10.4	55.0	+44.6	25.6	59.1	+33.5	37	69
Comparison	8.5	45.0	+36.5	18.3	56.4	+38.1		
Inference/Intrepretation	6.7	40.9	+34.2	16.0	54.4	+38.4		
Evaluation	24.8	46.8	+22.0	26.0	63.1	+37.1		
Grade 5:								
Analysis	16.7	52.8	+36.1	30.0	53.9	+23.9	31	46
Comparison	7.7	38.5	+30.8	23.0	58.2	+35.2		
Inference/Intrepretation	4.4	29.1	+24.7	15.0	33.7	+18.7		
Evaluation	8.9	37.2	+28.3	34.2	54.0	+19.8		
Grade 6:								
Analysis	38.8	60.4	+21.6	26.2	58.2	+32.0	7	39
Comparison	37.9	50.0	+12.1	19.5	49.8	+30.3		
Inference/Intrepretation	26.0	48.0	+22.0	15.4	43.2	+27.8		
Evaluation	38.6	44.6	+6.0	30.4	53.8	+23.4		

Minority students comprised 32 percent of the total McRAT group. Pre- and post-mean ratings of 75 minority and 154 non-minority students within the McRAT group were compared at grades four, five, and six (Table 3). Mean ratings of minority students show the same general trend as those of Chapter 1 students.

Although McRAT fourth-grade minority students scored lower than non-minority students on both pre- and post-assessments, there was no significant difference between the average total gain of minority (+34.3) and non-minority students (+36.7). Fourth-grade minority students showed greater gains on Analysis, similar gains on Comparison and Inference/Interpretation, and less gain on Evaluation than non-minority students.

Pre- and post-mean ratings of fifth-grade McRAT students followed the same trend as fourth-grade, but the average total gain of minority students (+29.2) was greater than non-minority (+24.4). Fifth-grade minority students showed greater gains on Analysis and Evaluation, but less gain on Comparison and Inference/Interpretation than other McRAT students.

Sixth-grade minority students scored higher on the pre-assessment for each thinking category than non-minority students within the McRAT group. On the post-assessment, minority students scored higher than non-minority students on Analysis and Inference/Interpretation, about the same on Comparison, and lower on Evaluation. The sixth-grade comparison is not statistically significant because of the small number of minority students in the sixth-grade sample.

CONCLUSIONS OF THE ONE-YEAR STUDY

This study compared student achievement in McRAT classrooms, where teachers were learning to refocus instruction for higher order thinking and writing, with student achievement in classrooms where instruction focused mainly on traditional approaches with texts and workbooks.

Students who received systematic instruction in thinking strategies made significant progress in their abilities to reason effectively and to communicate their ideas in writing while students who received traditional instruction showed no progress from beginning to end of the school year. The findings of this study are consistent with recent reports of the National Assessment of Educational Progress on student achievement in reading, thinking, and writing. A summary of findings from 20 years of NAEP shows that traditional instruction has changed little and student achievement levels are little different than they were two decades ago (Mullis, Owen, Phillips; 1990).

These results indicate that all students, regardless of achievement level or socioeconomic factors, can learn to reason and write effectively. Students in Chapter 1 reading programs showed as much or slightly more progress than other McRAT students and significantly more progress than all students in the control group. The percentage of McRAT students who could not write an essay or wrote off-task decreased from 31 percent on the pre-assessment to .04 percent on the post-assessment. Most of those students were Chapter 1 students. Achievement of minorities followed the same general trend as the Chapter 1 group because more than half that group was minority students.

Although tabular data are not presented in this report, T-tests were computed to determine the significant difference between groups. Students can show significant progress in a short period of time after McRAT instruction begins. McRAT students' scores on Analysis, after two months of instruction, increased from significantly lower to significantly higher than control students' scores after eight months of instruction. That trend was consistent for all four thinking skills at each grade level. This evidence is strengthened by the fact that a majority of the McRAT teachers in this study were new to the program and in the process of learning as they taught the students.

Procedures for administering post-assessments to McRAT students described earlier in this report may be viewed as a limitation of the research design. Post-assessments of three of the skills were administered to McRAT students at intervals during the year to assure that procedures for monitoring progress and instructional decision making were consistent with first year instruction. Teachers of control groups used monitoring procedures consistent with basal textbook approaches. The results of the post-assessment for Evaluation, administered to both groups in May, suggest that these assessment procedures did not affect the overall results. Student responses in two control classrooms showed evidence of some teaching of McRAT strategies. Although, there was interaction between teachers of McRAT and control groups within some schools, it did not appear to have a significant affect on the overall results. The significantly higher gains of McRAT students in these schools suggest the importance of the staff development process.

Results of this study, based on evaluation of student writing, provide an example of authentic, performance-based student achievement data. Studies which include other forms of performance-based assessment are needed. For example, tasks in which students are asked to explain the strategies being used and how they might apply to other situations would provide important information on students' use of metacognitive processes. Other studies are needed to measure long-term effectiveness of the McRAT program as these students move through the elementary and junior high grades.

IMPLICATIONS

Studies indicate that the McRAT program addresses National Education Goals for the year 2000 in the following ways:

- *The staff development process results in accelerated academic achievement for all students.*

- *McRAT students are demonstrating the ability to reason, solve problems, apply knowledge, and write and communicate effectively.*

- *Students are developing multicultural concepts that will help*

them become more knowledgeable about the diverse cultural heritage of this nation and about the world community.

• A variety of performance-based measures are used to assess student progress.

• Restructuring of curriculum and organization for instruction occurs in schools in response to the McRAT approach.

The progress shown by Chapter 1 students indicates that the McRAT approach holds promise for compensatory education.

The positive response and high degree of implementation by teachers in the McRAT program indicate potential for teacher training programs.

SUMMARY

Multicultural Reading and Thinking (McRAT) is a staff development process that empowers teachers to refocus instruction and restructure curriculum for higher order thinking. It addresses a coherent framework of skills with sound instruction and assessment. The multicultural emphasis provides a meaningful context for thinking activities and encourages parent and community involvement.

The effectiveness of the McRAT approach is supported by a rich body of qualitative and quantitative data collected across school districts and diverse populations. It offers implications for teacher training and other restructuring and curriculum reform efforts.

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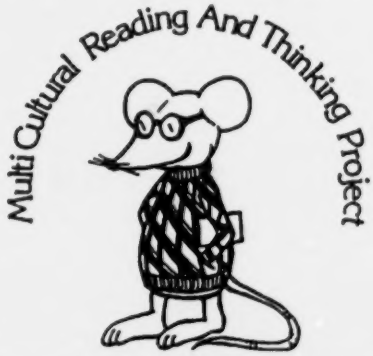

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